

Campden Instruments Ltd.

 **A Lafayette Instrument Company**

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INSTRUCTION MANUAL



**5100mz/
5100mz Plus**

Vibrating Blade Tissue Slicer

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Contents

1	Introduction		
2	Description of the Instrument		
3	Microtome blades		
4	Cleaning, Sterilizing and Autoclaving		
5	Installation		
6	Operation	6.1	Editing an existing user or registering a new user
		6.2	Change the operating parameters
		6.3	Load or unload the specimen bath
		6.4	Manual operation
		6.5	Slice window mode
		6.6	Fitting blades
		6.7	Settings
7	Options	7.1	Magnifier and cold light source
		7.2	Opti-Cal blade alignment
8	Maintenance and Service		
9	Returns & Decontamination Form		
10	Technical support		
	Error codes		
11	Packing List		
12	Spare Parts and Accessories		
13	Specifications		
14	Certificate of Conformity		

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1. Introduction

The 5100mz Tissue Slicer by Campden Instruments is an oscillating blade microtome. It is the result of considerable experience in the design and manufacture of tissue slicers. It has been conceived as a lower cost sibling of the 7000smz tissue slicer. It has a slightly lower performance specification but does share several features and concepts with its more sophisticated brother.

The 5100mz instrument is supplied with a fixed blade holder and the 5100mz Plus instrument is supplied with the optional adjustable blade holder and Opti-Cal unit.

A number of researchers have found that certain combinations of oscillation frequency, amplitude and tissue advance rate can give superior slice quality for a given tissue. The 5100mz allows these combinations to be developed solely by input from the keypad.

Experienced users of oscillating microtomes will no doubt be aware that large amplitudes and/or high oscillation frequencies can lead to excessive vibration and unstable tissue fluid. The 5100mz instrument benefits in this area by being built on a substantial, rigid cast base giving good immunity to secondary vibration transmission.

The purpose of this manual is to allow the user to achieve expertise in the use of the 5100mz instrument. Please read and understand the information contained in this manual before using the instrument. Only competent and capable personnel should use the instrument.

This document should be retained for future reference as it contains the name and address of the manufacturer within the EC.

PACKAGING

Please retain the original packaging for future use.

Instruments will not be accepted for service or repair unless the unit has been adequately and properly packaged. Additionally instruments will not be accepted without prior authorisation and have been certified as being uncontaminated with any material that may be hazardous to the health of our service personnel. A Returns Authorisation and Decontamination Certificate blank form is included in Section 9 of this manual and may be photocopied as required. Blank forms can also be obtained by contacting Campden Instruments.

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2. Description of the instrument

The 5100mz instrument features a removable blade holder mounted on a deep section parallel leaf spring assembly giving exceptional resistance to vertical (z axis) deflections and motion errors.

Blade motion is by non-contact magnetic attraction giving a high degree of immunity from out-of-plane forces whilst allowing variable oscillation rates and amplitudes.



The blade is advanced into the tissue under motor control via a rotary control knob on the remote keypad allowing continuous adjustment of speed. This is particularly useful when different areas of tissue need to be cut at different speeds. Blade retraction is carried out at maximum speed and only after the uncut tissue has been lowered away from the blade, eliminating the possibility of the blade being dragged back across the uncut tissue causing damage.

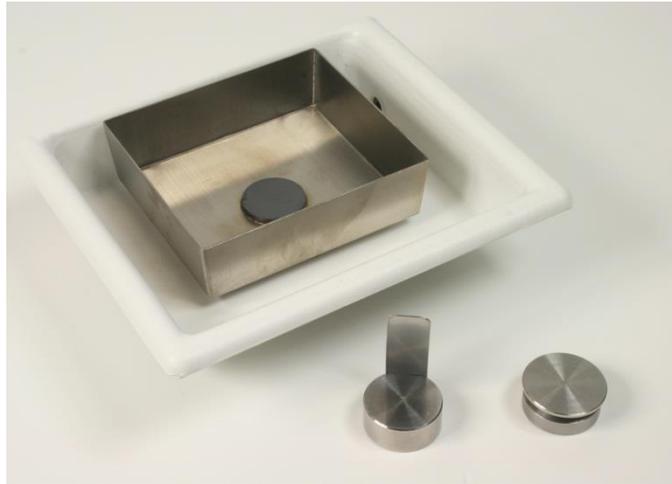
Feedback on the oscillation axis allows close control over vibration amplitude. Positional feedback on the advance axis allows the instrument to remember the slice start and stop position.

Raising the tissue up into the path of the advancing blade controls section thickness. This movement against gravity reduces lost motion and uncertainty to a minimum allowing section thickness to be controlled accurately. A sprung loaded dovetail arrangement for mounting the tissue bath gives a positive location of the bath whilst still allowing quick and easy removal.

A remote membrane keypad with LCD display allows the user to control the instrument and set the parameters governing blade frequency, section thickness, etc.

The instrument is supplied with a tissue bath having a ceramic magnet to locate and retain the specimen platen. A fixed specimen platen with removable specimen support is supplied as standard. The rotational position of the specimen platen can be adjusted using the tool provided. An adjustable specimen platen is available as an optional extra.

The tissue bath is also located and held in place within the outer bath by magnets.



Inner and outer tissue bath (background) with standard specimen platen (front left) and optional adjustable specimen platen (front right)

For enhanced observation of the tissue cutting process, a magnifying glass with integral cold light source is available as an optional extra.

The magnifier has a magnification factor of 1.5X and incorporates a circular array of variable power white LEDs allowing cold illumination of the cutting process. The power cord for the magnifier/light source plugs directly into the slicer and requires no other source of power.



5100mz slicer with illuminated magnifier

The Opti-Cal non-contact metrology device from the 7000smz slicer is available as an option. It is able to monitor the blade edge travel profile giving an indication of blade alignment error; if used together with the optional alignable blade holder (also from the 7000smz slicer) it will allow the blade to be adjusted relative to the lateral motion axis minimising the out-of-alignment error of the blade edge resulting in a potentially cleaner slice.

3. Microtome Blades

Whatever features and controls an oscillating microtome possesses, the quality of the slice can be enhanced by good blades and degraded by poor blades.

The average razor blade consists of a triple bevel on both faces of a thin foil made from either carbon or stainless steel. The triple bevel terminates in a relatively non-acute angle and is designed for cutting when being drawn across a surface perpendicular to the edge of the blade. The thin foil of a razor blade will almost certainly flex when clamped into a blade holder.

Carbon steel is relatively hard compared to stainless steel and a carbon steel blade will keep its cutting edge longer however it has the inherent disadvantage that it will rust quickly when exposed to moist air. To prevent rusting in storage carbon steel blades have a film of oil that must be removed before the blade can be used. The corrosion process is, of course, accelerated significantly in a.c.s.f. saline.

For these reasons normal razor blades and carbon steel blades are not recommended for precision tissue sectioning.

Campden Instruments supplies two types of blade for its oscillating microtomes:

7550-1-SS Stainless Steel Blades

Made from surgical quality stainless steel these are double bevelled on both faces, honed to an acute cutting edge.

Because of the relative softness of stainless steel, for optimum performance it is recommended that stainless steel blades should be used once only or, at a maximum, changed every day.

7550-1-C Ceramic Blades

Made from ultra-hard zirconium, this is a material that can be lapped to the finest of edges and the body of the blade is very rigid maintaining a straight cutting edge. The result is that slice quality is substantially improved with prolonged slice life, especially in the most difficult tissues such as young brain where structures are yet to be formed or very old brain with build-up of extracellular proteins and added structures. Additionally, the blade has a much longer life due to the ultra-hard cutting edge not losing its sharpness and being impervious to corrosion.

For studies where the deposition of metal into the slice would have undesirable effects the benefit of ceramic blades is clear.

The initial higher cost of the ceramic blade is more than offset by its longevity.

To facilitate fitting of the narrow blades a special blade holder tool is provided. This helps ensure correct blade alignment and reduces the risk of personal injury when fitting the blade. Further details are shown in Section 6.6 Fitting blades.

The 5100mz instrument is supplied with a fixed angle non-alignable titanium blade holder suitable for the 7550-1-SS stainless steel and 7550-1-C ceramic blades.

The alignable blade holder from the 7000smz slicer can be fitted to the 5100mz slicer and is available as an option; in this case the optional Opti-Cal unit (again from the 7000smz slicer) should be used so that blade edge alignment can be optimised. Note that with the adjustable blade holder fitted the optimum blade accuracy will be in the region of 0.003 . 0.005mm

Sample 7550-1-SS and 7550-1-C blades are included with each instrument.

4. Cleaning, Sterilizing and Autoclaving

The blade holder can be fitted to, or removed from, the vibrating head using the Pozidriv screw driver supplied.

The blade holder is made from titanium and may be autoclaved by normal methods.

Replacement blade holders are available as spares should the original items be lost or damaged.

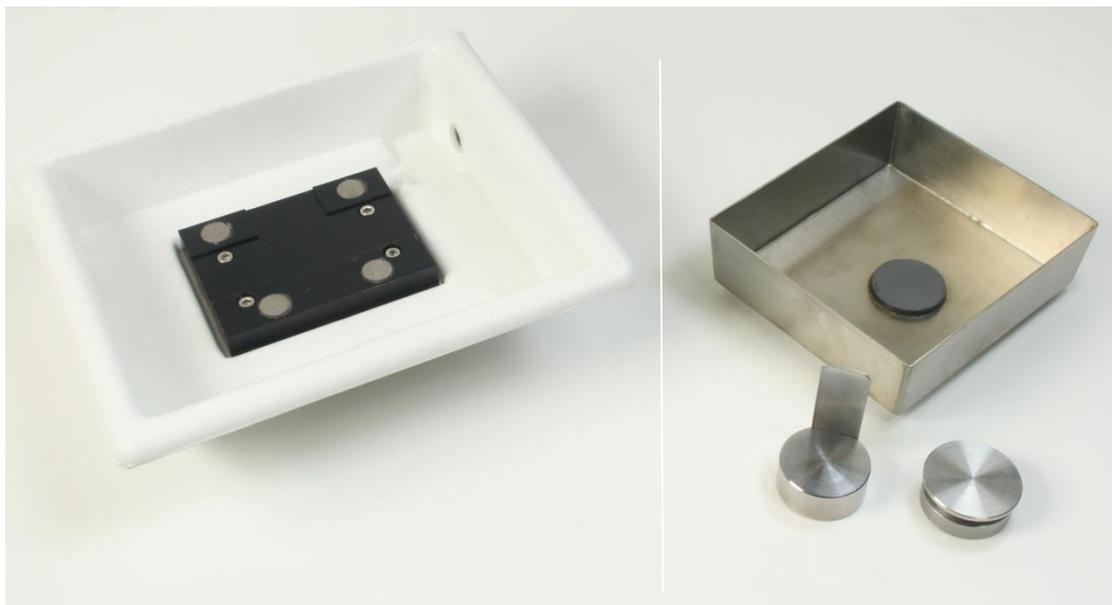
The stainless steel inner bath and specimen platens are made from a magnetic stainless steel; this steel is not completely immune from the effects of a.c.s.f. and the items should be thoroughly rinsed with clean water on a regular basis.

The specimen platen and the inner bath as shown in the illustration below are autoclavable. The specimen platen is located by a circular magnet in the inner bath. They may be separated by simply pulling the two items apart. The inner bath is also located in the outer bath by magnets.

Autoclaving of the specimen platen and inner bath may be carried out using normal procedures.

The outer bath and its associated parts contain thermoplastic materials and are not autoclavable, nor should they be dismantled.

Additional or replacement outer baths, inner baths and specimen platens are available as spares.



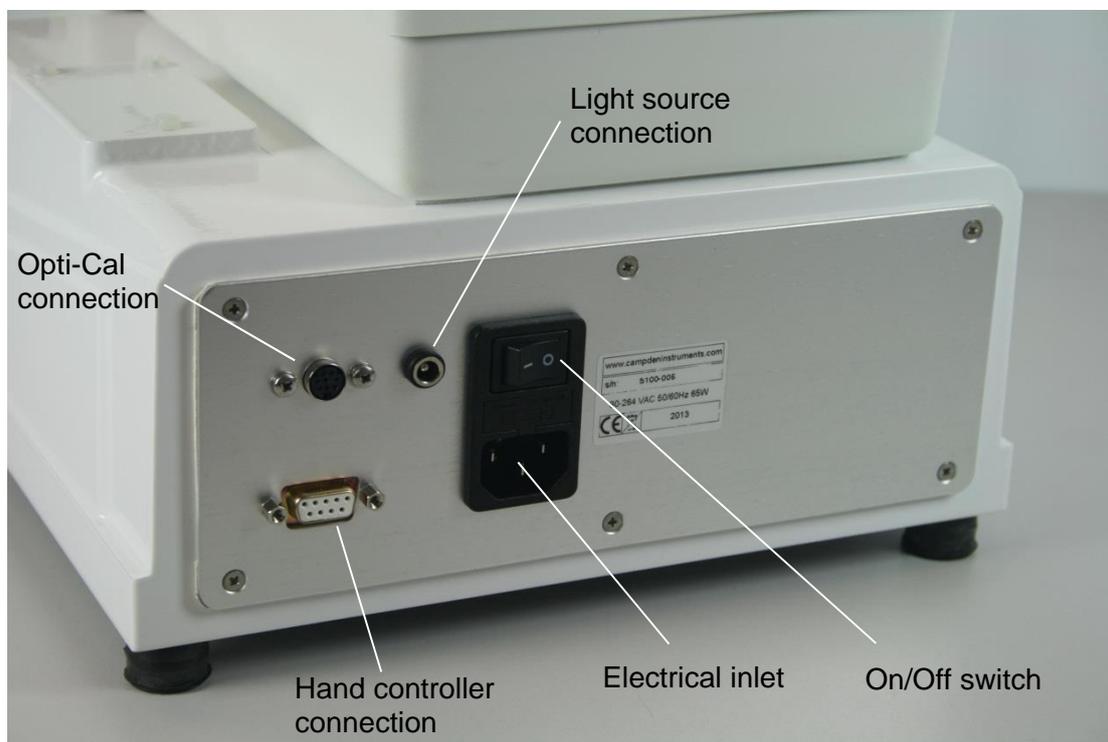
Outer bath . not autoclavable

Inner bath & specimen
platens - autoclavable

5. Installation

The instrument should be placed on a sturdy bench. Although the unit has a high static mass to vibrating mass ratio and absorbent rubber feet, a rigid support bench will enhance immunity from secondary vibration transmission.

The remote keypad and display should be connected to the appropriate socket on the rear panel of the instrument.



The instrument is suitable for connecting to a mains electrical supply 88-264VAC 47-63Hz. The electrical inlet moulding accepts a standard IEC socket. Where possible a standard mains lead - IEC socket/mains plug . suitable for your mains outlet will have been supplied with the instrument. The instrument must not be operated unless it is connected to a suitably earthed (grounded) mains supply.

If the magnifier/light source has been supplied with the instrument, reference should be made to the section 7 of this manual for the fitting and setting up procedure.

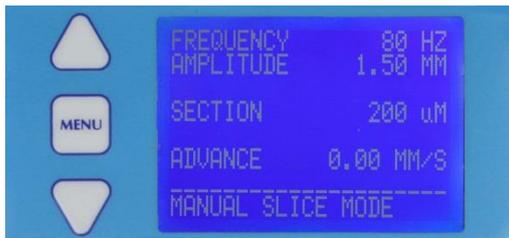
6. Operation

6.1 Edit an existing user name or registering a new user name



When the instrument is switched on the display will be as shown, showing any personalised user slots. This screen can also be accessed from the main menu.

Use the Δ or ∇ keys to scroll to the desired user name or to an unused position.



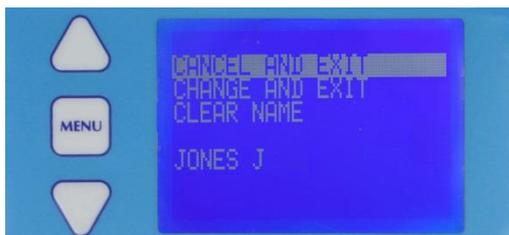
Press the MENU key to go to the display shown. This is the normal operating display.



Press the MENU key again and the display will change to that shown. Use the Δ or ∇ keys to scroll to the line SETTINGS



Press the MENU key again and then scroll to the line EDIT USER NAME and select.



Use the Δ or ∇ keys to scroll to the line (in the example shown) CHANGE AND EXIT . Pressing MENU again will cause the 1st letter of the name to be highlighted. The rotary knob can now be used to scroll through the alphabet to select a new letter or symbol. Press the Δ to confirm and move to the next letter position; use the rotary knob to select a new letter. (∇ selects the previous position). Continue until the new user name is acceptable.



Press the MENU key - this will highlight the new name.

Use the Δ or ∇ keys to scroll to the line CHANGE AND EXIT

Press MENU to confirm the change. Any changes to the oscillating frequency, amplitude and section thickness will be remembered under that user name so that when that user comes back to the instrument and selects that user name those settings will also be selected for immediate use

An existing user name can be deleted by scrolling to the line CLEAR NAME and pressing MENU.

Press MENU again to revert to the normal operating display.

6.2 Change the operating parameters:

Frequency

Amplitude

Section thickness



Press the MENU key to display the basic menu screen as shown:



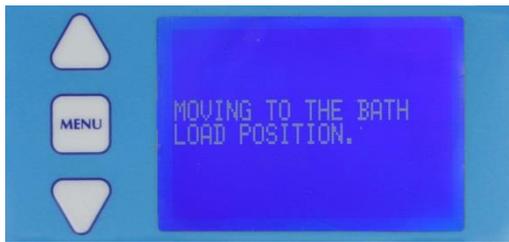
Use the Δ or ∇ keys to scroll to the desired parameter:

Frequency . amplitude - section.

Press the MENU key to select that parameter and highlight the value.

The Δ or ∇ keys can now be used to change the parameter's value. Press the MENU key to confirm and store the change.

6.3 Load or Unload the specimen bath



Press the \pm OAD BATH \square key (and hold for 2 seconds) and the display will change to that shown. The bath table will be moved to its lowest position to allow a specimen bath to be loaded (or an existing one removed).



Once the table has reached its lowest position the display will be as shown. The specimen bath is located on the rising table in a sprung loaded dovetail mount.

To remove the bath, move the clamp lever to the left and pull the bath away from the instrument.



Pressing the \pm OAD BATH \square key will cause the table to rise to a pre-set (nominal) position.

The display will then revert to the \pm home \square display.

Pressing the \pm SLICE WINDOW \square key will enter the blade alignment routine. See Section 6.9 \pm Alignment of the blade with the axis of oscillation \square for detailed guidance on the use of the \pm Opti-Cal \square alignment calibrator. (Note the \pm Opti-Cal \square is only supplied as standard with the 5100mz Plus instrument).

Note: users wanting to customise the tissue mount must ensure that the total weight of ice bath, tissue bath and contents must not exceed 800g, or this would cause over-load of the motor.

6.4 Manual Operation

When the instrument is first switched on, scroll to the desired user name and press MENU. All cutting parameters associated with that user will be recalled.

If desired, make any changes as described in Section 6.2 and scroll to the **EXIT MENU** line and press the **MENU** key. If necessary load a bath as outlined in section 6.3. The table will raise the bath to a nominal position and the operating screen will change to that shown in the following illustration:



Bringing the blade to the start height



Press the **HEIGHT** key.

Press the **LOAD BATH** key to raise the table quickly or the **ADVANCE** key to lower it quickly.

Press again to stop.

Set a movement amount using the rotary knob. Press the **RETURN** key to raise the table by this amount. Press the **SLICE** key to lower the table by this amount.

Press the **SLICE WINDOW** key to reset the height datum.

Press the **HEIGHT** key once more to exit.

Bringing the specimen to the start position



Press the **ADVANCE** key and using the rotary knob to control the advance speed. Press the **SLICE** key to switch the movement on or off.

Bring the cutting blade into a suitable position for commencement of cut. When the blade is in a suitable position, press the **ADVANCE** key again to exit.

(This selects the start position such that when the **RETURN** key is pressed [see next page] this is the position the blade will return to).

Cutting a slice



Press the **SLICE ON/OFF** key to commence the cut. The bottom line of the display will show a flashing warning:

!!!CAUTION SLICING!!!

Use the rotary knob to control the advance speed as the blade moves through the tissue.

(Note that, if desired, the advance speed can be reduced past zero and the cutting head moved in reverse).

When the cut has been completed press the **SLICE ON/OFF** key to halt the process.



The \uparrow RETURN \downarrow key may now be used to retract the head to the position you had selected as the start position above. Before the head retracts the bath will be lowered so that the blade does not drag across the surface of the specimen. After the head has been retracted the bath will be raised to its previous position and then raised once more by the thickness of the section in readiness for another cut.

When the cutting head has been retracted to the start position, the section thickness will be highlighted on the display. If required, the section thickness may be changed by pressing the height button and making any adjustment required via the rotary control knob. Note that this will change the section thickness for this slice only. If you want to change the repeat thickness this should be done by changing the general operating parameters . see the section above \uparrow Changing the operating parameters \downarrow

The cut may now be repeated.

6.5 Slice Window Mode

Once a cut has been taken as described in the manual slice procedure, the start point and end point of that slice operation is stored in memory. In slice window mode the user can slice between these points and the unit will automatically stop at the end point. The user can select if the slice operation finishes at the end point or automatically retracts to the start point ready for the next slice (see section 6.7).

It is not possible to enter the slice window mode unless you have previously defined a slice window.



When a satisfactory cut window has been made, press the **SLICE WINDOW** key once and the slice window screen will be displayed. The led adjacent to that key will be illuminated in red as a warning.

Using the rotary knob set a suitable advance speed for cutting. You only need to do this the first time you take a slice. Successive slices will be taken at this speed.

Pressing the **RETURN** button will take the slicer to the start point and increment the section thickness for the next slice.

Press the **SLICE ON/OFF** key to commence cutting or to stop cutting.

The unit will automatically stop cutting at the stop point.

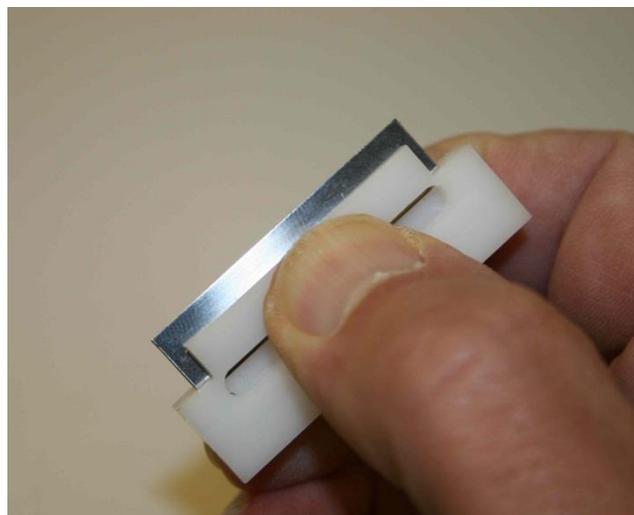
6.6 Fitting blades with the blade fitting tool

The 5100mz is supplied with a fixed angle blade holder which is not adjustable for horizontal alignment. Fit the blade holder to the instrument face plate by offering it up to the face plate and fitting the two securing screws. Whilst the screws are still loose push the blade holder upwards so that the protruding lugs on its rear locate with the lower edge of the face plate. Tighten the screws. The blade can now be fitted. The blade holder accepts only 7550-1-SS Stainless Steel Blades or 7550-1-C Ceramic Blades.



When fitting or removing blades, care must be taken as the blades supplied by Campden Instruments are very sharp. *Always use the blade holding tool supplied.* The blade tool has been designed so that the blade may be safely handled without the effective cutting length of the blade edge being exposed to possible damage or injuring the operator.

After carefully unwrapping the blade it should be placed, sharp edge first into the slot of the blade tool. The blade tool can then be squeezed using the thumb and forefinger . see the illustration below.



The blade is now safely gripped with its cutting edge protected from damage and can be safely handled during the fitting operation with minimal risk of personal injury.



The blade should be fitted by loosening the two screws in the arms of the holder and sliding the blade under each washer and pushing it firmly back against the rear stops. The screws should not be over-tightened. See the illustration above. Note that the left hand screw has a left hand thread and should be turned counter-clockwise to tighten it. The right hand screw has a normal right hand thread.

A blade guard is included with the instrument: this incorporates a magnet and can simply be fitted over the blade with the magnet holding it in position. See the following illustration.



This will provide some protection to the user and reduce the possibility of accidental damage to the blade edge. We recommend that it is used whenever the instrument is not actually in use.

If you want to improve the cut by reducing the Z axis deflection error you can fit the blade holder from the 7000smz instrument and align it using the Opti-Cal system. The alignment procedure is dealt with in the Chapter 7.2.

6.7 Settings



From the basic menu screen use the Δ or ∇ keys to scroll to the line **SETTINGS** and press the MENU key.

1) The display screen may be adjusted for brightness and contrast to suit local conditions.



Use the Δ or ∇ keys to scroll to line required and press the MENU key. The feature value will be highlighted and may be adjusted using the Δ or ∇ keys. Press the MENU key to confirm the change.

Use the Δ or ∇ keys to scroll to line EXIT MENU and press the MENU key to get back to the basic menu display.

2) When in Slice Window mode, the park position for the slicer can be set as either at the end of the slice just taken or at the beginning of the next slice.

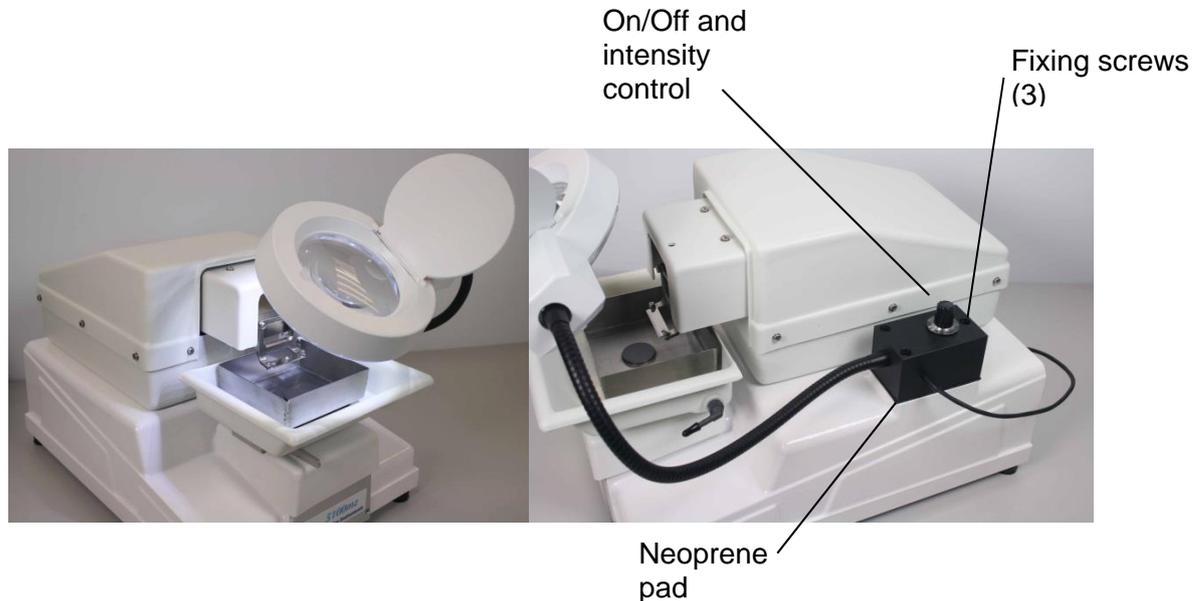


Use the Δ or ∇ keys to scroll to the AUTOSTOP line. Press the MENU key to toggle between AUTOSTOP AT END or AUTOSTOP AT START. Use the Δ or ∇ keys to scroll to line EXIT MENU and press the MENU key to get back to the basic menu display.

7 Options

7.1 Magnifier & cold light source

The instrument may be (optionally) supplied with a magnifier mounted on a flexible arm. The magnifier housing incorporates a LED cold light source. The base should be fixed to plinth on the right hand side of the instrument. Place the neoprene cushioning pad between the instrument and the magnifier base body before fitting and tightening the three fixing screws. Do not over-tighten the screws. This is illustrated below.



The power cable plugs directly into the appropriate outlet on the rear of the 5100mz slicer (see illustration in Section 5 . Installation). This outlet must not be used for any other purpose.

The light source can be switched on or off and the light intensity controlled via a rotary knob on the body of the light source where the flexible arm is mounted. Turn the knob clockwise to switch the light on. Continue turning the knob clockwise to increase the light intensity. To turn the light source off, turn the knob counter clockwise until a click is felt.

Adjust the position of the magnifier as required.

Note that the magnifying lens and LED cover are made from acrylic materials and may be irreparably damaged if cleaned with anything containing solvents or alcohol. They should only be cleaned using a non-abrasive tissue or cloth which has been dampened with a mild detergent mixed with water.

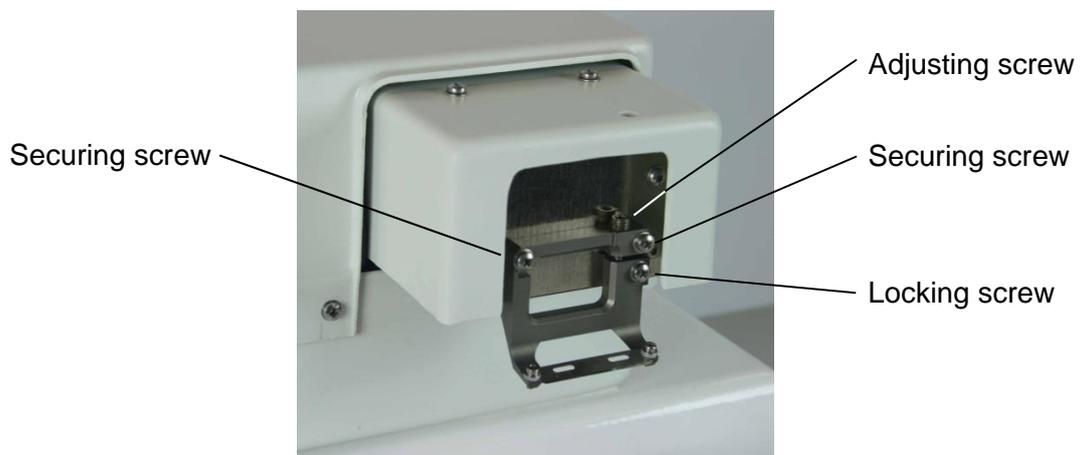
7.2 Opti-Cal - Alignment of the blade with the axis of oscillation.

Note the 'Opti-Cal' and adjustable blade holder are only supplied as standard with the 5100mz Plus instrument.

The mechanism of the slicer controls the lateral oscillation of the blade within very fine tolerances. Owing to manufacturing variations and tolerances in blades, blade holder, etc. and inconsistencies in mounting the blade in its holder, the blade edge may not be truly aligned with the lateral motion axis. If this adversely affects tissue quality and becomes problematic then the blade holder from the 7000smz can be used instead of the standard unit. This will allow the blade edge to be more closely aligned to the vibration axis by using the Opti-Cal alignment equipment.

If you already have an Opti-Cal from a 7000smz slicer then you can use this . but see the Important Note below.

The 7000smz blade holder is secured by two screws to the oscillating faceplate. A third screw locks the blade holder in position once the alignment procedure has been completed. See the illustration below.



Fit the blade holder as shown and tighten the two upper securing screws - (maximum tightening torque = 30-40cN.m). Do not over-tighten the screws. The lower locking screw should be tightened sufficiently to just grip the lower portion of the blade holder.

In order to facilitate alignment of the blade with the axis of travel and so minimise the z axis deflections, the demountable Opti-Cal calibration device should be used. A socket on the rear panel of the instrument is provided for the Opti-Cal device to be connected . see the illustration in Section 5.



Important Note

If you have the optional light source/magnifier fitted and are using an early Opti-Cal from a previously purchased 7000smz slicer (i.e. an Opti-Cal with serial number prior to CI.7000-6-1A-161) the connecting cable may be only just long enough. In this instance the cable must be routed between the vibrating head enclosure and the magnifier base before plugging it into the rear of the instrument – see the following illustration.



Opti-Cal cable routing

When the Opti-Cal calibration device is connected to the instrument its presence will automatically be detected and it will take control of the amplitude and frequency settings, adjusting them to a magnitude that allows best adjustment of the blade alignment error. The alignment process also automatically moves the blade so that the cutting edge is in its optimal position relative to the calibration device for best alignment evaluation.

To enter the alignment routine, press the **LOAD BATH** key (and hold for 2 seconds). The bath table will be moved to its lowest position to allow the Opti-Cal to be loaded. Press **SLICE WINDOW** to begin the blade alignment routine.

The alignment routine can also be accessed from the main menu.



When the unit has been connected, the instrument will detect the connection and the display will change as shown.

Install the alignment device and new blade.

Press **SLICE** to continue.



You must now choose which type of blade you want to calibrate. Scroll to the appropriate blade using the Δ or ∇ keys and press MENU to select. Press SLICE to continue. The instrument will now re-position the blade with respect to the alignment device ready for adjustment.



The display will now change to that shown on the left. Note that the uppermost line shows the current Z axis (vertical) deflection. Initially it will indicate zero because the blade is not moving.

Press SLICE as instructed and when the blade is vibrating note the Z axis deflection reading.

Press SLICE again to stop the blade vibration.

Loosen the lower locking screw just sufficiently tight to retain its grip on the blade holder but without locking it in place.

Using the hex driver supplied, turn the adjusting screw by a small amount - the lower portion of blade holder will be tilted in a clockwise direction if the adjusting screw is turned clockwise. Conversely, it will be tilted in a counter-clockwise direction by turning the adjusting screw counter-clockwise.

Tighten the lower locking screw.

Press SLICE to set the blade vibrating again and note the Z axis deflection. Stop the blade vibrating. If the error has increased you should repeat the adjustment but in the opposite direction.

Continue the above process until the Z axis deflection has been reduced to acceptable limits. Once the blade is within acceptable limits the lower locking screw may be tightened to a torque of 30-40 cN.m. Do not over-tighten the screw.

Recheck the blade alignment. Repeat the adjustment procedure if required.

When you have completed the alignment procedure press the RETURN key and follow the removal instructions as shown on the display.

In certain circumstances, for example if a steel blade is fitted and you have specified a ceramic blade, the control system may position the blade incorrectly and not detect the blade edge. In these instances the display will show the following message:



Correct any problems and press **SLICE** to retry.

8 Maintenance and Service

The 5100mz instrument has been designed to give reliable, trouble-free service. After the equipment has been in service for a number of years it may be advisable to have a comprehensive service, Campden Instruments or its local agents will be pleased to give advice on this and we operate a fast turnaround on equipment returned for service or repair.

Instruments will not be accepted for service or repair unless the unit has been adequately and properly packaged.

Additionally, instruments will not be accepted without prior authorisation and have been certified as being uncontaminated with any material that may be hazardous to the health of our service personnel. A Returns Authorisation & Decontamination Certificate blank is shown on the next page. The form may be photocopied as required. Further blanks can be obtained by contacting Campden Instruments.

Before returning the instrument you should contact Campden Instruments to obtain a Returns Authorisation Number.

The completed Returns Authorisation & Decontamination Certificate should then be placed in a prominent position in the shipping carton where it can be readily found.

10 Technical support

techsupport@campdeninstruments.com

Should you have experience any problems with the instrument Campden Instruments has a Technical Support facility. Before you contact Technical Support it would be helpful to have the following information available so that your enquiry may be dealt with more efficiently. Technical Support can only help with queries relating to the instrument function, queries regarding instrument application should be directed to the sales department at Campden Instruments.

Instrument model number
Instrument serial number
Build date
Blade run time
Software revision code
Any error codes that you may have witnessed

This information may be readily accessed from the basic menu screen as follows.



Use the Δ or ∇ keys to scroll to the line **ABOUT** and press the MENU key.



The screen will now display the parameters required to contact Technical Support.

Pressing the MENU key once more will exit this screen.

Error Codes

Note that if an error code occurs the instrument will stop. The instrument must be restarted by recycling the power.

Code 1: Internal communications error.

Restart the instrument. If the problem persists contact Technical Support for advice.

Code 2: Internal communications error.

Restart the instrument. If the problem persists contact Technical Support for advice.

Code 3: Advance limit switch fault.

If the error occurs repeatedly during normal use contact Technical Support for advice.

Code 4: Table limit switch fault.
Contact Technical Support for advice.

Code 5: Oscillating head fault.
If motion of the vibrating head has been obstructed, restart the instrument and carefully drive the blade away from the obstruction.
If the error occurs repeatedly during normal use contact Technical Support for advice.

Code 10: Alignment tool communications error.
If the alignment tool has been unplugged during the blade alignment procedure, restart the instrument.

If the error occurs repeatedly during normal use contact Technical Support for advice.

11 Packing List

5100mz

5100mz Tissue slicer	1 off	
Tissue bath assembly	1 off	
Outer bath assembly	1 off	
Tool case	1 off	
Containing:		
Fixed blade holder	1 off	
Blade guard	1 off	
Blade handling tool	1 off	
Specimen platen	1 off	
Adjustable specimen platen	1 off	
Stainless steel blades	10 off	(7550-1-SS)
Ceramic blades	2 off	(7550-1-C)
Cross head screwdriver	1 off	
Hexagonal driver (1.5mm)	1 off	
Specimen platen adjusting spanner	1 off	
Mains lead	1 off	
Operator's handbook	1 off	
Shipping carton	1 off	

5100mz Plus

5100mz Tissue slicer	1 off	
Tissue bath assembly	1 off	
Outer bath assembly	1 off	
Tool case	1 off	
Containing:		
Adjustable blade holder	1 off	
Opti-Cal	1 off	
Blade guard	1 off	
Blade handling tool	1 off	
Specimen platen	1 off	
Adjustable specimen platen	1 off	
Stainless steel blades	10 off	(7550-1-SS)
Ceramic blades	2 off	(7550-1-C)
Cross head screwdriver	1 off	
Hexagonal driver (1.5mm)	1 off	
Hexagonal driver (3 mm)	1 off	
Specimen platen adjusting spanner	1 off	
Mains lead	1 off	
Operator's handbook	1 off	
Shipping carton	1 off	

Magnifying lens/cold light source, 7000smz alignable blade holder, Opti-Cal and other optional extras: as ordered.

12 Spare Parts and Accessories

When ordering, please order by part number and description.

Magnification

Magnifying lens (1.5X) with integral cold light source CI.5100-1-3

Tissue bath assemblies

Complete tissue bath assembly (inner bath + outer bath) CI.7000-3-1A

Inner tissue bath assembly CI.7000-3-2

Outer bath assembly CI.7000-3-3A

Specimen platens

Replacement specimen platen (standard) CI.7000-4-1

Adjustable specimen platen CI.7000-4-2

Blade holders

5100mz Blade holder CI.5100-5-1

7000smz Blade holder (alignable using Opti-Cal) CI.7000-5-3

Replacement blade clamp screws CI.7000-5-4

(Left & right hand screws with washers)

Blade alignment equipment

Opti-Cal optical calibration unit CI.7000-6-1A

Blade Handling

Blade Handling Tool CI.7000-7-1

Blade guard CI.7000-7-2

Blades

Stainless steel blades (pack of 50) CI.7550-1-SS

Ceramic blades (pack of 5) CI.7550-1-C

Miscellaneous

Tool set with case CI.5100-50-1

Shipping Carton with foam packing material CI.5100-60-1

13 Specifications

Section thickness step size	0.001 mm
Bath table rise & fall speed	1.0 mm/sec maximum
Maximum (vertical) travel of bath table	19 mm
Tissue bath size	80mm x 90mm x 25mm (nominal)
Tissue bath volume (with specimen platen)	160ml (nominal)
Cutting head advance speed	
Minimum forward speed:	0.1 mm/sec
Maximum forward speed:	+2.0 mm/sec (1mm/sec whilst cutting)
Maximum reverse speed:	- 2.0 mm/sec (-1 mm/sec whilst cutting)
Cutting head retraction speed	2.0 mm/sec
Maximum travel of cutting head	36 mm (nominal)
Blade oscillation frequencies	50 to 80 Hz (nominal) in 5Hz steps
Blade oscillation amplitudes	0.5/1.0/1.5 mm (nominal)
Mechanism Z axis error	0.008mm max
Power requirements	88-264 VAC 47-63 Hz
Power rating	36W
Fuse rating (115V)	T2A 250VAC
(230V)	T2A 250VAC
Bench space requirement (mm) (Excludes Keypad/control unit)	270 Width x 400 Depth x 260 Height
Keypad/control unit (mm)	135 W x 200 D x 60 H
Weight	15Kg
Boxed shipping weight	19Kg
Shipping box size (mm)	550 (W) x 470 (D) x 370 (H)

EC DECLARATION OF CONFORMITY

1. Product Model:

Model Type: 5100MZ & 5100SMZ

2. Manufacturer:

CAMPDEN INSTRUMENTS (a trading name of Certain Indexes Ltd)
4 Park Road, Sileby, Loughborough, Leicestershire, LE12 7TJ, UK.

3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

4. Object of the Declaration:

Vibrating Tissue Slicer

5. The object of the declaration described above is in conformity with the relevant Essential Health & Safety Requirements of the following relevant Union harmonisation legislation:

- 2014/30/EU EMC Directive
- 2006/42/EC Machinery Directive
- 2011/65/EU RoHS Directive
- 2015/863 Amendment to RoHS Directive

6. References to the relevant harmonised standards used in relation to which conformity is declared:

- EN 60204-1:2006+A1:2009
- EN 61010-1:2010
- BS EN 61326-1:2013
- BS EN 61000-3-2:2014
- BS EN 61000-3-3:2013
- BS EN 55011:2013

7. I hereby declare the equipment named above complies with the relevant CE Marking Legislation and I am the person authorised to compile the technical documentation.

Signed for and on behalf of:

Campden Instruments (address above) on 24th February 2020

G. Prescott (Director)

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